

In the Claims

Please amend the claims as follows:

1. A method of forming an isolation trench in a semiconductor comprising:

forming a first isolation trench portion having a first depth and having a first sidewall intersecting a surface of the semiconductor at a first angle;

forming a second isolation trench portion within and extending below the first isolation trench portion, the second isolation trench portion having a second depth and including a second sidewall intersecting the first sidewall at an angle with respect to the surface that is greater than the first angle; and

filling the first and second isolation trench portions with dielectric material.

2. The method of claim 1, wherein forming a second isolation trench portion includes forming the second angle to be between eighty and ninety degrees.

3. The method of claim 1, wherein forming a first isolation trench portion includes forming the first angle to be in a range of from about thirty degrees to about seventy degrees and forming a second isolation trench portion includes forming the second angle to be more than eighty degrees.

7. The method of claim 5, wherein etching and depositing comprises:

providing fluorocarbon gases; and

supplying radio frequency excitation to the mixture.

8. The method of claim 1, wherein forming the first isolation trench portion comprises plasma etching the first isolation trench portion using gases including CF_4 and CHF_3 in a ratio of $\text{CF}_4/\text{CHF}_3 = 0.11$ to 0.67 .

9. The method of claim 1, wherein forming the first isolation trench portion comprises:

forming a silicon nitride layer on the semiconductor surface;

forming a masking layer having an opening disposed therein atop the silicon nitride layer, the opening including sidewalls;

plasma etching through the silicon nitride layer using gases including CF_4 and CHF_3 in a ratio of $\text{CF}_4/\text{CHF}_3 = 0.11$ to 0.67 ;

depositing a polymer on the sidewalls during plasma etching;

continuing etching for a predetermined time after the silicon nitride layer has been broached and continuing depositing polymer on the sidewalls; and

stopping etching and depositing when the predetermined interval ends.

15. The method of claim 14, wherein forming a first isolation trench portion comprises forming a first isolation trench portion including a sidewall at least some of which forms a substantially straight linear segment.

16. The method of claim 13, further comprising forming a second isolation trench portion within and extending below the first isolation trench portion, the second isolation trench portion including a second sidewall intersecting the first sidewall at an angle with respect to the surface that is greater than the first angle.

17. The method of claim 16, wherein forming a first isolation trench portion comprises forming a first isolation trench portion having a first depth of between five and fifty percent of a total trench depth.

18. The method of claim 17, further comprising:
filling the first and second isolation trench portions with dielectric material; and
planarizing the dielectric material filling the first and second isolation trench portions.

19. The method of claim 13, wherein forming a mask comprises:
forming a silicon nitride layer on the semiconductor surface; and
forming a masking layer having an opening disposed therein atop the silicon nitride layer, the opening including sidewalls.

20. The method of claim 19, wherein etching the surface comprises:

plasma etching through the silicon nitride layer;
continuing etching for a predetermined time interval after the silicon nitride layer has been broached and continuing to deposit polymer on the sidewalls; and
stopping the etching and depositing at the end of the predetermined time interval.

21. The method of claim 19, further comprising forming a second isolation trench portion within and extending below the first isolation trench portion, the second isolation trench portion having a second depth and including a second sidewall intersecting the first sidewall at an angle with respect to the surface that is greater than the first angle.

one side of the gate and the drain region being disposed adjacent another side of the gate that is opposed to the one side.

23. The method of claim 22, wherein forming a first isolation trench portion comprises etching the silicon surface using gases including CF_4 and CHF_3 in a ratio of $\text{CF}_4/\text{CHF}_3 = 0.11$ to 0.67 .

24. The method of claim 22, wherein forming a mask comprises:
forming a silicon nitride layer on the semiconductor surface; and
forming a masking layer having an opening disposed therein atop the silicon nitride layer, the opening including sidewalls.

25. The method of claim 22, wherein forming a first isolation trench portion comprises:

plasma etching through the silicon nitride layer using conditions that also deposit a polymer on the sidewalls;

continuing etching for a predetermined time after the silicon nitride layer has been broached and continuing to deposit polymer on the sidewalls;
and

stopping the etching and depositing at the end of the predetermined interval.

26. The method of claim 25, wherein plasma etching comprises etching using gases including CF_4 and CHF_3 in a ratio of $\text{CF}_4/\text{CHF}_3 = 0.11$ to 0.67.

27. The method of claim 22, wherein forming a first isolation trench portion comprises forming a first isolation trench portion having a first sidewall intersecting a surface of the semiconductor at an angle in a range of from about thirty degrees to about seventy degrees.

28. The method of claim 22, wherein forming a first isolation trench portion comprises forming a first isolation trench portion including a sidewall at least some of which forms a substantially straight linear segment.

29. The method of claim 27, wherein forming a second isolation trench portion comprises forming a second isolation trench portion having a second sidewall forming an angle of more than eighty degrees with the surface.

30. The method of claim 22, wherein forming a first isolation trench portion comprises forming a first isolation trench portion having a first depth of between five and fifty percent of a total trench depth.

31. The method of claim 30, further comprising planarizing the dielectric material filling the first and second isolation trench portions.

32. The method of claim 22, wherein forming a gate comprises forming a gate comprising polysilicon.

Please cancel claims 33-61 without prejudice.